Specification

LQ049B5DG04

Version October 2005

RECORDS OF REVISION

MODEL No : LQ049B5DG04

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(1) Application

This specification applies to color TFT-LCD module, LQ049B5DG04.

(2) Summary and Features

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control-PWB, FPC, PWB, frame, sealed front case, and sealed back case, backlight unit. Graphics and texts can be displayed on a 320×3×96dots panel with 262,144 colors by supplying.

It isn't composed DC/AC inverter.

The 4.9 screen produces a high resolution image that is composed of 30,720 pixels elements in a stripe arrangement.

Wide Viewing Angle technology is adopted. (The most suitable viewing angle is in the 6 o'clock direction.)

By adopting an active matrix drive, a picture with high contrast is realized.

Reflection due to external light is minimized through the use of a low reflection black matrix and an antiglare (AG) plate. A thin, light and compact module is accomplished through the use of COG mounting technology.

Through the use of TN-normally white mode, an image with highly natural color reproduction is realized.

An antiglare (AG) surface polarizer is used.

Semi self-heating backlight that is excellent of brightness rising characteristics at low temperature in consideration of automotive application.

An inverted video display in the vertical and horizontal directions is possible.

(3) Mechanical specifications

table 3-1

Parameter	Specifications	Units	Remarks
Display format	30,720	pixels	
	960(W)×96(H)	dots	
Active area	120.0 (W) ×36.0 (H)	mm	
Screen size (Diagonal)	12.5 [4.9"]	cm	
Dot pitch	0.125 (W) × 0.375 (H)	mm	
Pixel configuration	R,G,B Stripe configuration		
Outline dimension	142.0(W)×53.5(H)×13.0(D)	mm	【Note3-1】
Mass	110 ± 20	g	

【Note 3-1】 Typical values are given. For detailed measurements and tolerances, please refer to Fig. 1.

(4)Input terminal

4-1)TFT-LCD panel driving part

Used connector: SFR30R-1STE1 (Nihon FCI Co., Ltd)

Table 4-1

Pin No.	Symbol	Description	Remarks
1	VGH	+10V power supply	
2	ENAB	Signal to settle the horizontal display position	【Note4-2】
3	HVR	Selection for horizontal and vertical scanning direction	【Note4-3】
4	B5	BLUE data signal(MSB)	
5	B4	BLUE data signal	
6	B3	BLUE data signal	
7	B2	BLUE data signal	
8	B1	BLUE data signal	
9	B0	BLUE data signal(LSB)	
10	VSH	+5V power supply	
11	VSH	+5V power supply	
12	G5	GREEN data signal(MSB)	
13	G4	GREEN data signal	
14	G3	GREEN data signal	
15	G2	GREEN data signal	
16	G1	GREEN data signal	
17	G0	GREEN data signal(LSB)	
18	GND	ground	
19	R5	RED data signal(MSB)	
20	R4	RED data signal	
21	R3	RED data signal	
22	R2	RED data signal	
23	R1	RED data signal	
24	R0	RED data signal(LSB)	
25	VGL	−10V power supply	
26	Vsync	Vertical synchronous signal	【Note4-1】
27	Hsync	Horizontal synchronous signal	【Note4-1】
28	GND	ground	
29	CK	Clock signal for sampling each data signal	
30	GND	ground	

【Note 4-1】

Hsync	positive
Vsync	positive

【Note 4-2】 The horizontal display start timing is settled in accordance with a rising timing of ENAB signal. In case ENAB is fixed "Low", the horizontal start timing is determined as described in Fig7-1. (Don't keep ENAB "High" during operation. (7-2).)

【Note 4-3】 HVR = "High": Regular video
HVR = "Low": Horizontally and Vertically inverted video

4-2) Backlight fluorescent tube driving part

Used connector: BHR-02 (8.0)VS-1N(JST Co., Ltd.)

Fit connector: SM02 (8.0)B-BHS-1N(JST Co., Ltd.)

Table 4-2

No.	symbol	i /o	function	Color of FL cable
1	VL1	i	input terminal	ORANGE
2	NC		open	
3	VL2	i	input terminal	WHITE

(5)Absolute maximum ratings

Table 5-1 GND＝0 V

Parameter	Symbol	MIN	MAX	Unit	Note
Input voltage	V_I	-0.3	+6.0	V	【Note 5-1】 Ta=25℃
+5V power supply	VSH	0	+6.0	V	Ta＝25℃
+10Vpower supply High	VGH	0	+12	V	〃
−10Vpower supply Low	VGL	0	−12	V	〃
Storage temperature	Tstg	-40	+85	℃	【Note 5-2, 3】
Operating temperature (Panel surface temperature)	Topr1	-30	+85	℃	【Note 5-2, 3, 4】
Operating temperature (Ambient temperature)	Topr2	-30	+70	℃	【Note 5-5,6】

【Note 5-1】 CK, R0～R5, G0～G5, B0～B5, Hsync, Vsync, ENAB, HVR

【Note 5-2】 This rating applies to all parts of the module and should not be exceeded.

【Note 5-3】 Maximum wet-bulb temperature is less than 58℃. Condensation of dew must be avoided as electrical current leaks will occur, causing a degradation of performance specifications.

【Note 5-4】 The operating temperature only guarantees operation of the circuit. For contrast, speed response, and other factors related to display quality, determine operating temperature using the formula Ta =+25℃

【Note 5-5】 Ambient temperature when the backlight is lit (reference value).

【Note 5-6】 Lamp current shall be reduced ,in case temperature on the panel surface exceeds 85℃.

(6) Electrical characteristics

6-1)TFT-LCD panel driving section

Table 6-1 GND＝0 V, Ta＝−30～85℃

Parameter		Symbol	MIN	TYP	MAX	Unit	Remarks
+5V	Supply voltage	VSH	+4.5	+5.0	+5.5	V	【Note 6-1】
	Current dissipation	ISH	−	+22	+45	mA	【Note 6-2】
+10V	Supply voltage	VGH	+9.5	+10.0	+10.5	V	
	Current dissipation	IGH	−	+20	+25	mA	【Note 6-3】
−10V	Supply voltage	VGL	-9.5	-10.0	-10.5	V	
	Current dissipation	IGL	−	-16	-20	mA	【Note 6-3】
Permissive input ripple		V_{RF}	−	−	100	mVpp	VSH=+5V
Input Low voltage		V_{IL}	−	−	0.3×VSH	V	【Note 6-4】
Input High voltage		V_{IH}	0.7×VSH	−	−	V	
Input current (Low)		I_{IL}	−	−	1.0	μA	V_I=0V 【Note 6-5】
Input current (High)		I_{IH}	−	−	1.0	μA	V_I=+5V 【Note 6-5】

◎Turn on :VGL→VSH→VGH or same time

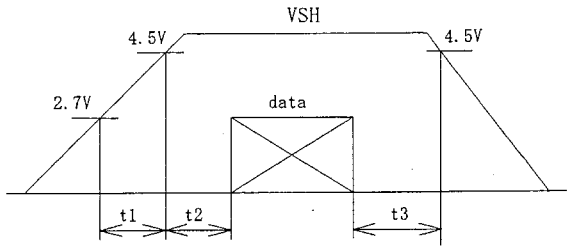
◎Turn off :VGH→VSH→VGL or same time

【Note 6-1】 VSH-turn-on conditions

t1≦10ms

0<t2≦10ms

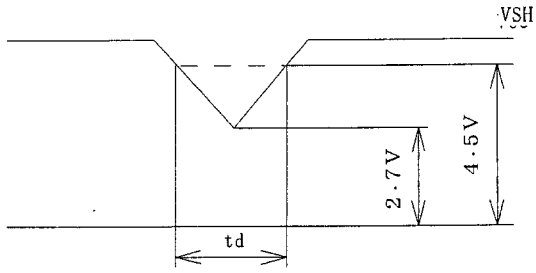
0<t3≦1s



VSH-dip conditions

1) 2.7V≦VSH<4.5V
   td≦10ms
2) VSH<2.7V

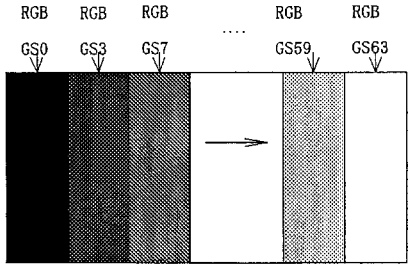
VSH-dip conditions should also follow the VSH-turn-on conditions.



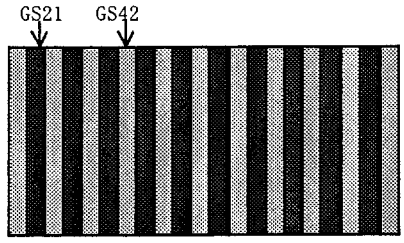
【Note 6-2】 Typical current situation: 64-gray-bar pattern. Timing; Typical

Max current situation: Vertical stripe pattern alternating 21 gray scale (GS21) with 42 gray scale (GS42) every 1 dot. Timing; Typical

VSH=+5.0V VGH=+10V VGL=−10V



Typical current situation



Max current situation

【Note 6-3】 Current situation : Black pattern Timing; Typical

【Note 6-4】 CK,R0～R5,G0～G5,B0～B5,Hsync,Vsync,ENAB,HVR

【Note 6-5】 CK,R0～R5,G0～G5,B0～B5,Hsync,Vsync,ENAB,HVR

6-2)Backlight driving section

The backlight system is an edge-lighting type with single CCFT (Cold Cathode Eluorescent Tube). The characteristics of Lamp are shown in the following table.

Table 6-2

Parameter	Symbol	MIN	TYP	MAX	Unit	Remarks
lamp voltage	VL7	310	350	390	Vrms	IL=6.5mArms
lamp current	IL	3.0	6.5	7.0	mArms	ordinary state
		—	—	9.0	mArms	within 5 minutes at low temperature
lamp power	WL	—	2.3	—	W	ratings
lamp frequency	fL	30	—	60	kHz	
kick-off voltage	VS	—	—	1150	Vrms	Ta=+25℃
		—	—	1200	Vrms	Ta=-30℃

Inverter : HIU-288 (Output condenser : 22pF) TOSHIBA HARISON LIGHTING co. Ltd.

Caution: Please use the inverter which has the one of the sine wave. With regards to the inverter, it should be negative/positive wave symmetry and the spike wave should not be occurred.

7)Timing Characteristics of input signals

Timing diagrams of input signal are shown in Fig.7-1

7-1) Timing characteristics

Table 7-1

Parameter		Symbol	MIN	TYP	MAX	Unit	Remarks
Clock	frequency	1/Tc	5.8	6.3	6.8	MHz	
	High time	Tch	60	—	—	ns	
	Low time	Tcl	60	—	—	ns	
Data	Setup time	Tds	20	—	—	ns	
	Hold time	Tdh	20	—	—	ns	
Horizontal sync. signal	Cycle	TH	55.0	63.5	67.7	μs	
			322	400	440	clock	
	Pulse width	THp	12	12	12	clock	
Vertical sync. signal	Cycle	TV	242	262	330	line	
	Pulse width	TVp	1	1	200	line	
Horizontal display period		THd	320	320	320	clock	
Hsync-Clock phase difference		THc	50	—	120	ns	
Hsync-Vsync phase difference		TVh	1.5	—	4.0	μs	
Vertical display start position		TVs	76	76	76	line	

Note) In case of lower frequency, the deterioration of display quality, flicker etc., may be occurred.

7-2) Horizontal display position

The horizontal display position is determined by ENAB signal and the input data corresponding to the rising edge of ENAB signal is displayed at the left end of the active area.

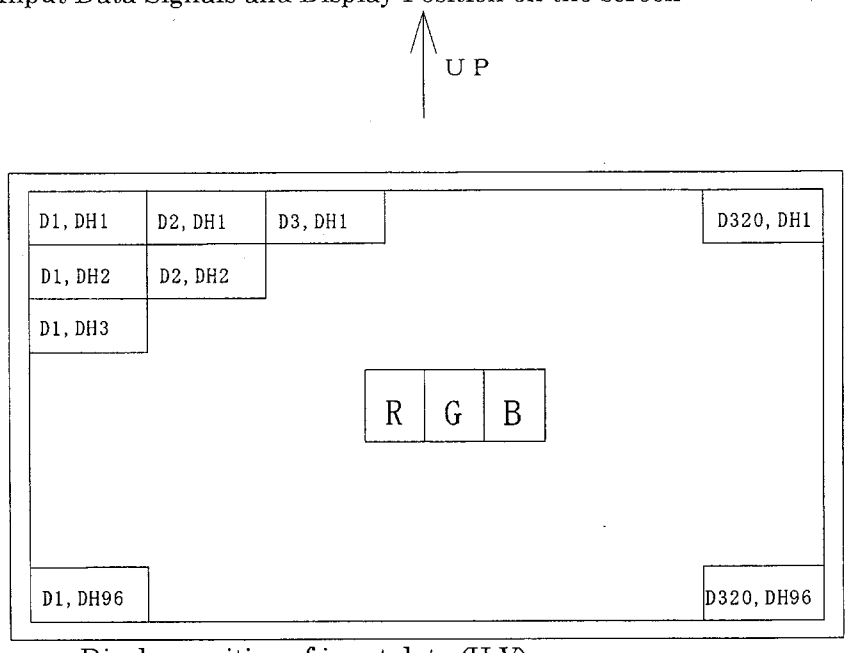
Parameter		symbol	Min.	Typ.	Max.	Unit	Remark
Enable signal	Setup time	Tes	50	—	120	ns	
	Pulse width	Tep	2	320	TH－10	clock	
Hsync-Enable signal phase difference		THe	14	—	71	clock	

Note) When ENAB is fixed "Low", the display starts from the data of C72 (clock) as shown in Fig.7-1.

7-3) Vertical display position

The Vertical display start position (TVs) is fixed 76 line.
ENAB signal has no relation to the vertical display position.

7-4) Input Data Signals and Display Position on the screen



Display position of input data (H,V)

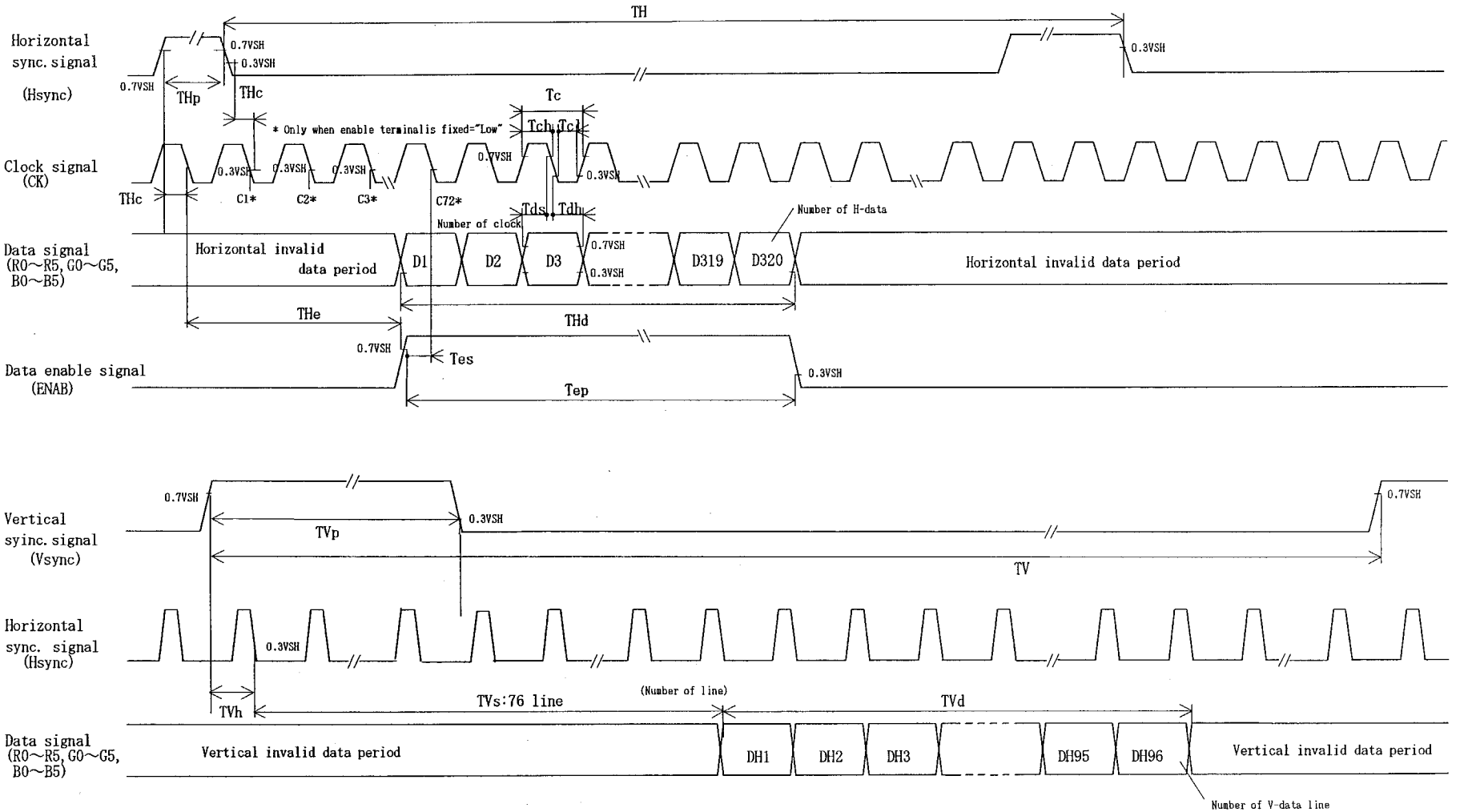


Fig. 7-1 Input signal waveforme

(8) Input Signals, Basic Display Color and Gray Scale of Each Color

	Colors & Gray scale	Data signal																	
		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	–	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	⇩	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of bleu	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	⇩	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Bleu	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 :Low level voltage 1 :High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. According to the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

(9)Optical characteristics

Table 9-1 Ta=25℃, VSH=+5V,VGH=+10V,VGL=－10V

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		θ21, θ22	CR≧5	60	65	—	° (degree)	【Note 9-1】
		θ 11		60	65	—	° (degree)	
		θ 12		35	40	—	° (degree)	
Contrast ratio		CRmax	Optimal viewing angle	60	—	—		【Note 9-2】
Response time	Rise	τ r	θ = 0°	—	30	60	ms	【Note 9-3】
	Fall	τ d		—	50	100	ms	
Luminance		Y	IL=6.5mArms	260	350	—	cd/m²	【Note 9-4】
Rising-up[-20℃]		Ylow	IL=9.0mArms	—	60	—	%	【Note 9-5】
White chromaticity		x	IL=6.5mArms	0.295	0.345	0.395		【Note 9-4】
		y		0.305	0.355	0.405		
lamp life time	+25℃	-	continuation	10,000	—	—	hour	【Note 9-6】
	-30℃	-	intermission	2,000	—	—	time	【Note 9-7】

DC/AC inverter for external connection has shown in following.

HIU-288(Output condenser : 22pF) (TOSHIBA HARISON LIGHTING Co., Ltd.)

※ Measuring after 30 minutes operation.

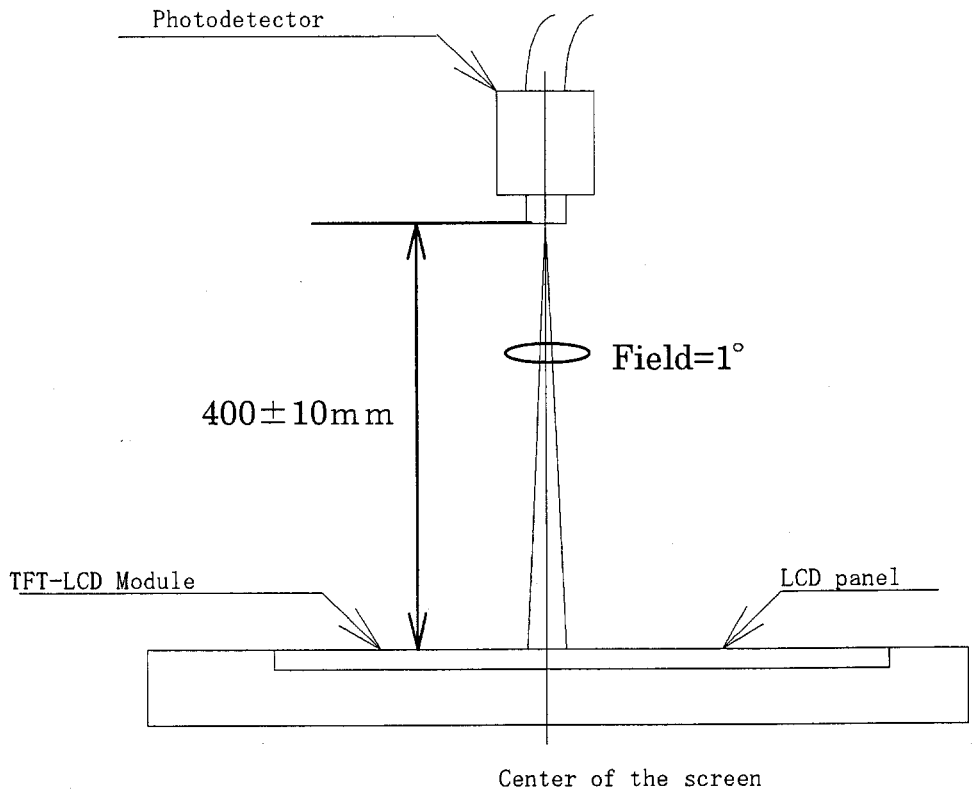
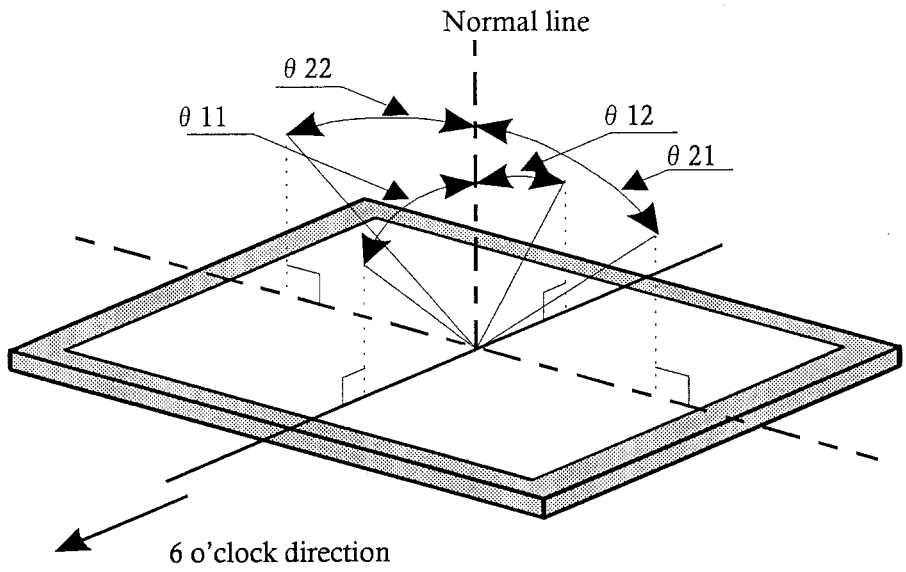


Fig.9-1 Optical characteristics measurement method

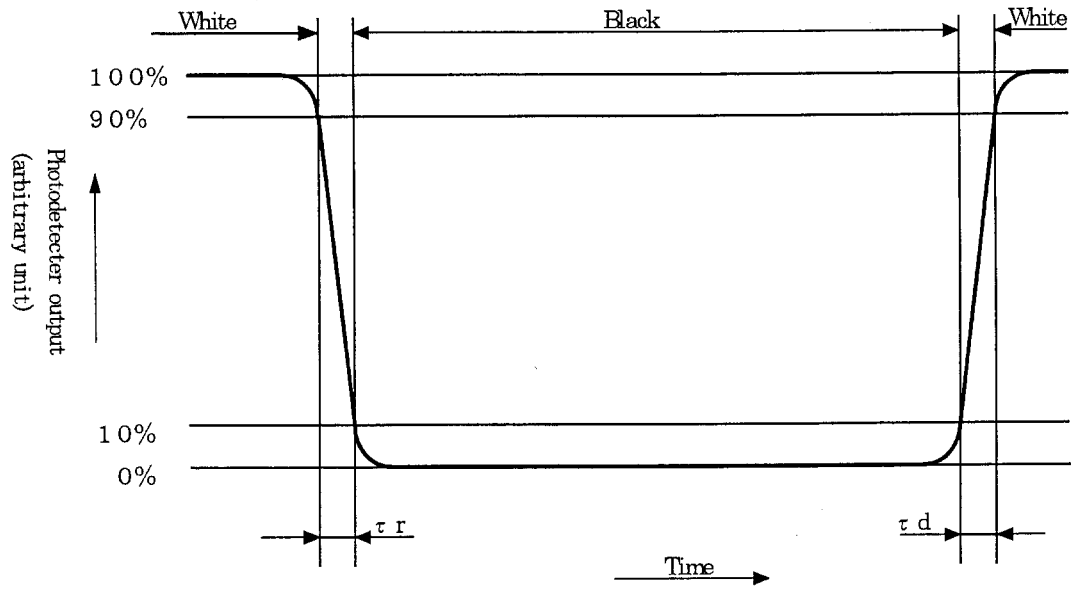
【Note 9-1】 Viewing angle range is defined as follows.



【Note 9-2】 Contrast ratio is defined as follows:

$$\text{Contrast ratio(CR)} = \frac{\text{Photo detector output with LCD being "white"}}{\text{Photo detector output with LCD being "black"}}$$

【Note 9-3】 Response time is obtained by measuring the transition time of photo detector output, when input signals are applied so as to make the area "black" to and from "white".

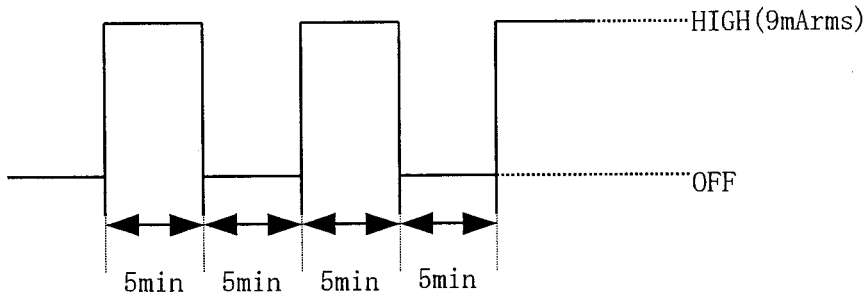


【Note 9-4】 Measured on the center area of the panel at a viewing cone 1° by TOPCON luminance meter BM-7.(After 30 minutes operation)
DC/AC inverter driving frequency: 49kHz

【Note 9-5】 Relative luminance after 2 minutes at -20℃ against the stable luminance regarding Ta=25℃ as 100%.

【Note 9-6】 Lamp life time is defined as the time when brightness not to become under 50% of the original value in the continuous operation under the condition of lamp current IL=3.0～7.0mArms and PWM dimming 100%~5% (Ta=25℃)

【Note 9-7】 The intermittent cycles is defined as a time when brightness not to become under 50% of the original value under the condition of following cycle.
Ambient temperature:-30℃



(10) Display quality

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standards for TFT-LCD.

(11) Handling instructions

11-1) Mounting of module

The TFT-LCD module is designed to be mounted on equipment using the mounting tabs in the four corners of the module at the rear side.

On mounting the module, as the M2.6 tapping screw fastening torque is 0.3 through 0.4N·m is recommended, be sure to fix the module on the same plane, taking care not to wrap or twist the module.

Don't reach the pressure of touch-switches of the set side to a module directly, because images may be disturbed.

Please power off the module when you connect the input/output connector.

Please connect the metallic shielding cases of the module and the ground pattern of the inverter circuit surely. If that connection is not perfect, there may be a possibility that the following problems happen.

a) The noise from the backlight unit will increase.

b) The output from inverter circuit will be unstable. Then, there may be a possibility that some problems happen.

c) In some cases, a part of module will heat.

d) Don't pull a CCFT lead line with the power beyond 10N. It has the possibility of the breakage in the lamp, the connection part of the lead line, and so on.

11-2) Precautions in mounting

Polarizer which is made of soft material and susceptible to flaw must be handled carefully. Protective film (Laminator) is applied on the surface to protect it against scratches and dirties. It is recommended to peel off the laminator immediately before the use, taking care of static electricity.

Precautions in peeling off the laminator

A) Working environment

When the laminator is peeled off, static electricity may cause dust to stick to the polarizer surface. To avoid this, the following working environment is desirable.

a) Floor: Conductive treatment of 1MΩ or more on the tile
(Conductive mat or conductive paint on the tile)

b) Clean room free form dust and with an adhesive mat on the doorway

c) Advisable humidity:50%~70% Advisable temperature:15℃~27℃

d) Workers shall wear conductive shoes, conductive work clothes, conductive gloves and an earth band.

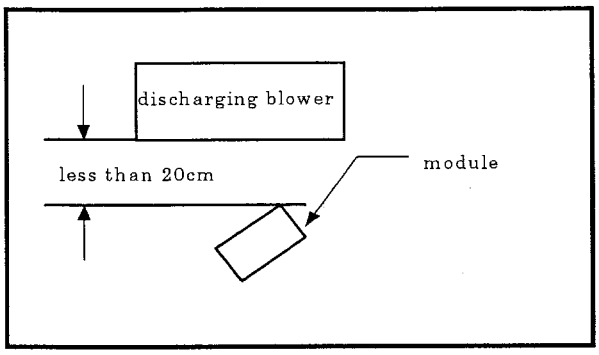
B) Working procedures

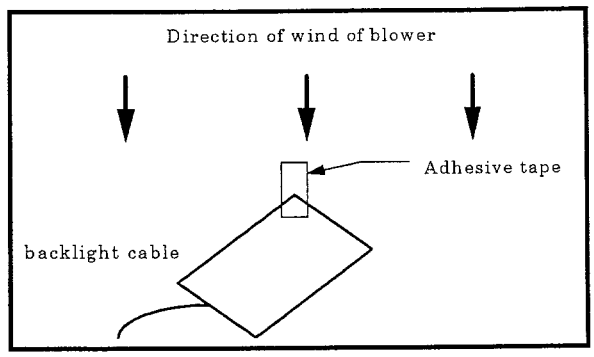
a) Direct the wind of discharging blower somewhat downward to ensure that module is blown sufficiently. Keep the distance between module and discharging blower within 20 cm.

b) Attach adhesive tape to the laminator part near discharging blower so as to protect polarizer against flaw.

c) Peel off laminator, pulling adhesive tape slowly to your side taking 5 or more second.

d) On peeling off the laminator, pass the module to the next work process to prevent the module to get dust.





e) Method of removing dust from polarizer

- Blow off dust with N2 blower for which static electricity preventive measure has been taken.
- Since polarizer is vulnerable, wiping should be avoided.
  But when the panel has stain or grease, we recommend to use adhesive tape to softly remove them from the panel.

When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth. For stubborn dirties, wipe the part, breathing on it. Wipes off water drop or finger grease immediately. Long contact with water may cause discoloration or spots. TFT-LCD module uses glass that breaks or cracks easily if dropped or bumped on hard surface. Handle with care. Since CMOS LSI is used in this module, take care of static electricity and earth your body when handling.

11-3) Precautions in adjusting module

Adjusting volumes on the rear face of the module have been set optimally before shipment. Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described here may not be satisfied.

11-4) Caution of product design

The LCD module shall be protected against water salt-water by the waterproof cover.

Please take measures to interferential radiation from module, to do not interfere surrounding appliances.

11-5) Others

Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours; liquid crystal is deteriorated by ultraviolet rays. Store the module at a temperature near the room temperature. At lower than the rated storage temperature, liquid crystal solidifies, causing the panel to be damaged. At higher than the rated storage temperature, liquid crystal turns into isotropic liquid and may not recover. The kick-off voltage of lamp may over the normal voltage because of leakage current from approach conductor by to draw lamp lead line around. If LCD panel breaks, there may be a possibility that the liquid crystal escapes from the panel. Since the liquid crystal is injurious, do not put it into the eyes or mouth. When liquid crystal sticks to hands, feet or clothes, wash it out immediately with soap. Observe all other precautionary requirements in handling general electronic components.

(12) Packing form

a)Piling number of cartons : MAX 10

b)Package quantity in one carton 50 pcs

c)Carton size: 510 mm(W)×460 mm(H)×190 mm(D)

d)Total mass of one carton filled with full modules: 6.5 k g

e)Environment

Temperature	: 0～40℃
Humidity	: 60%RH or less(at 40℃)
Atmosphere	: Harmful gas, such as acid or alkali that bites electronic components and/or wires, must not be detected.
Period	: About 3 months

Opening of the package: In order to prevent the LCD module from breakdown by electrostatic charges, please control the room humidity over 50%RH and open the package sufficient countermeasures against electrostatic charges, such as earth, etc.

(13) Others

a)Adjusting volume have been set optimally before shipment, so do not change any adjusted value.
If adjusted value is changed, the specification may not be satisfied.

b)Disassembling the module can cause permanent damage and should be strictly avoided.

c)Please be careful since image retention may occur when a fixed pattern is displayed for a long time.

d)Indication of lot number
The lot number is shown on a label. Attached location is shown in Fig.1(Outline Dimensions).
Indicated contents of the label

LQ049B5DG04	○○○○○○○○
Model No.	Lot No.

Contents of Lot No. the 1st figure ·· production year : (ex.2000 : 0)
the 2nd figure ·· production month : 1,2,3,·····,9,X,Y,Z
the 3rd~7th figure ·· serial No. : 00001～
the 8th figure ·· revision marks : blank, A,B,C ···

e) Input/output connector performance

A) Input/output connectors for the operation of LCD module

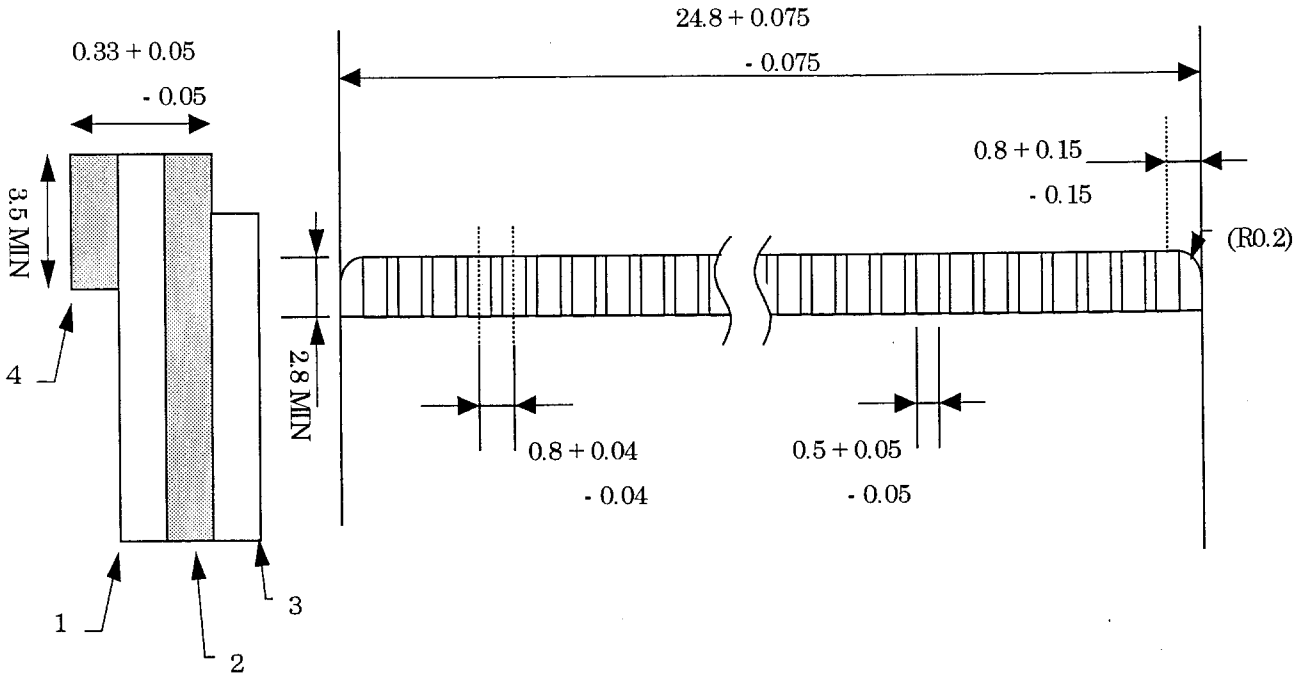
SFR30R-1STE1 (Nihon FCI Co., Ltd) 30 pin

1) Applicable FPC refer the below figure

2)Terminal holding force : More than 0.9N/pin : Thickness of FPC is t=0.33mm.

(Each terminal is pulled out at a rate of 25 ±3mm/min.)

3) Insertion/pulling: contact resistance is not twice larger than the durability initial value after applicable FPC is inserted and pulled out 20 times



No.	Name	Materials
1	Base material	Polyimide or equivalent material(25 μ m thick)
2	Copper foil	Copper foil(35 μ m thick) Solder plated over 2 μ m
3	Cover lay	Polyimide or equivalent material
4	Reinforcing plate	Polyester polyimide or equivalent material(188 μ m thick)

FPC applied to input/output connector (0.8mm pitch)

(14) Reliability Test Conditions for TFT-LCD Module

Table 13-1

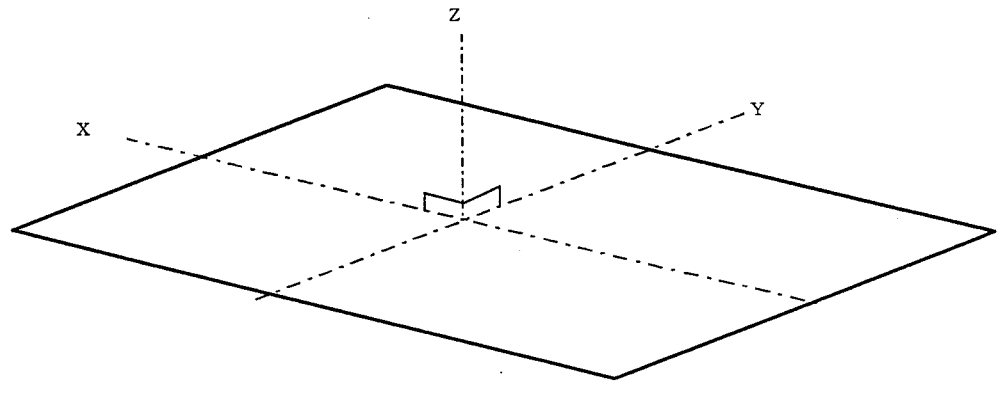
Remark) Temperature condition is based on operating temperature conditions on (5)-Table 5-1.

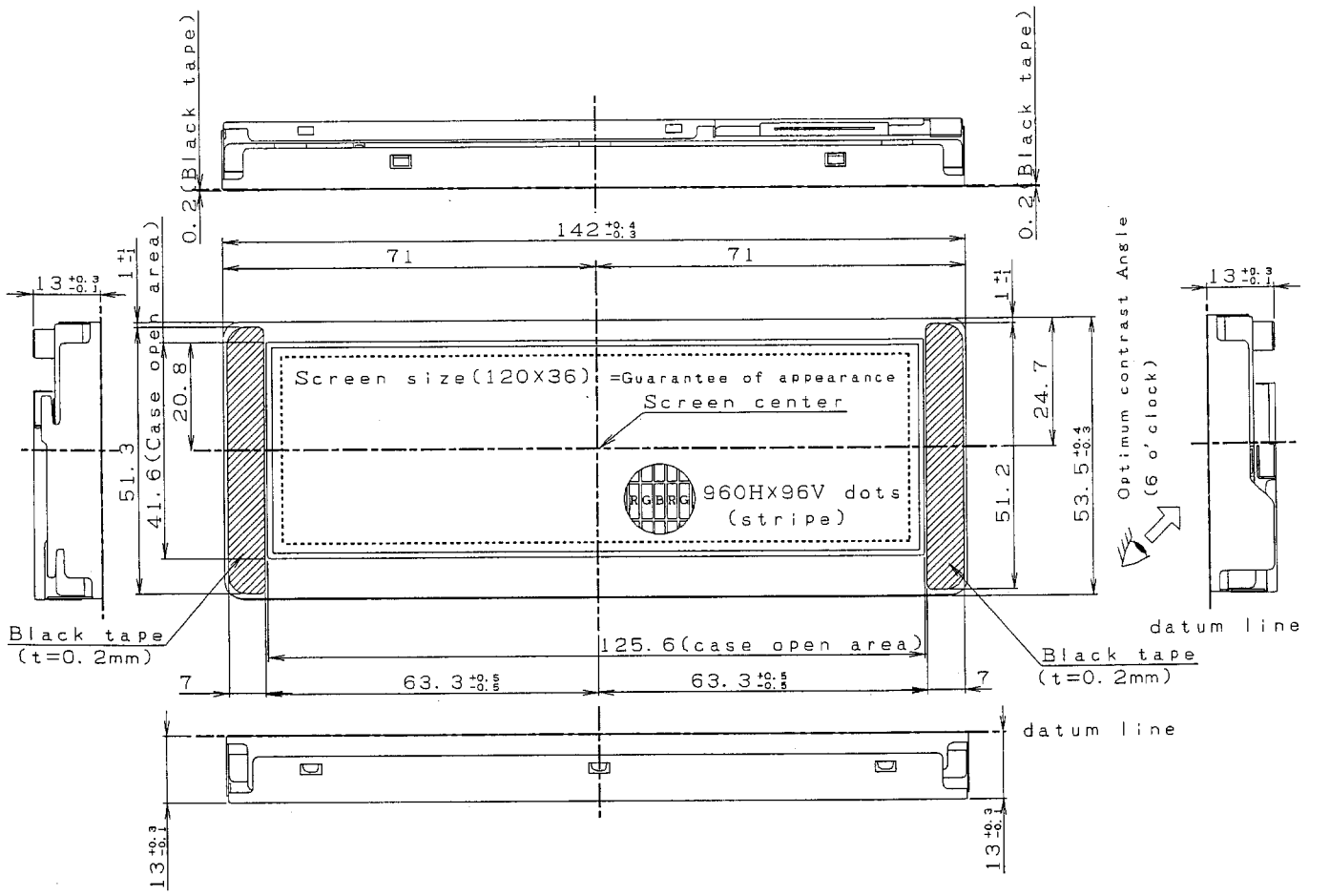
No.	Test items	Test conditions
1	High temperature storage test	Ta= +85℃ 240h
2	Low temperature storage test	Ta=−40℃ 240h
3	High temperature and high humidity operating test	Tp= +60℃, 90～95%RH 240h
4	High temperature operating test	Tp= +85℃ 240h
5	Low temperature operating test	Ta=−30℃ 240h (expect the life of lamp)
6	Electro static discharge test	±200V・200pF(0Ω) 1 time for each terminals
7	Shock test	980m/s²・6ms, ±X ; ±Y ; ±Z 3 times for each direction (JIS C0041, A-7 Condition C)
8	Vibration test	Frequency : 8～33.3Hz, Stroke : 1.3mm Frequency : 33.3Hz～400Hz, Acceleration : 28.4m/s² Sweep cycle : 15 minutes X,Z 2 hours for each directions, 4 hours for Y direction (total 8 hours) (JIS D1601)
9	Heat shock test	Ta=−30℃～+85℃ / 200 cycles (0.5h) (0.5h)

【Note】 Ta= Ambient temperature, Tp= Panel temperature

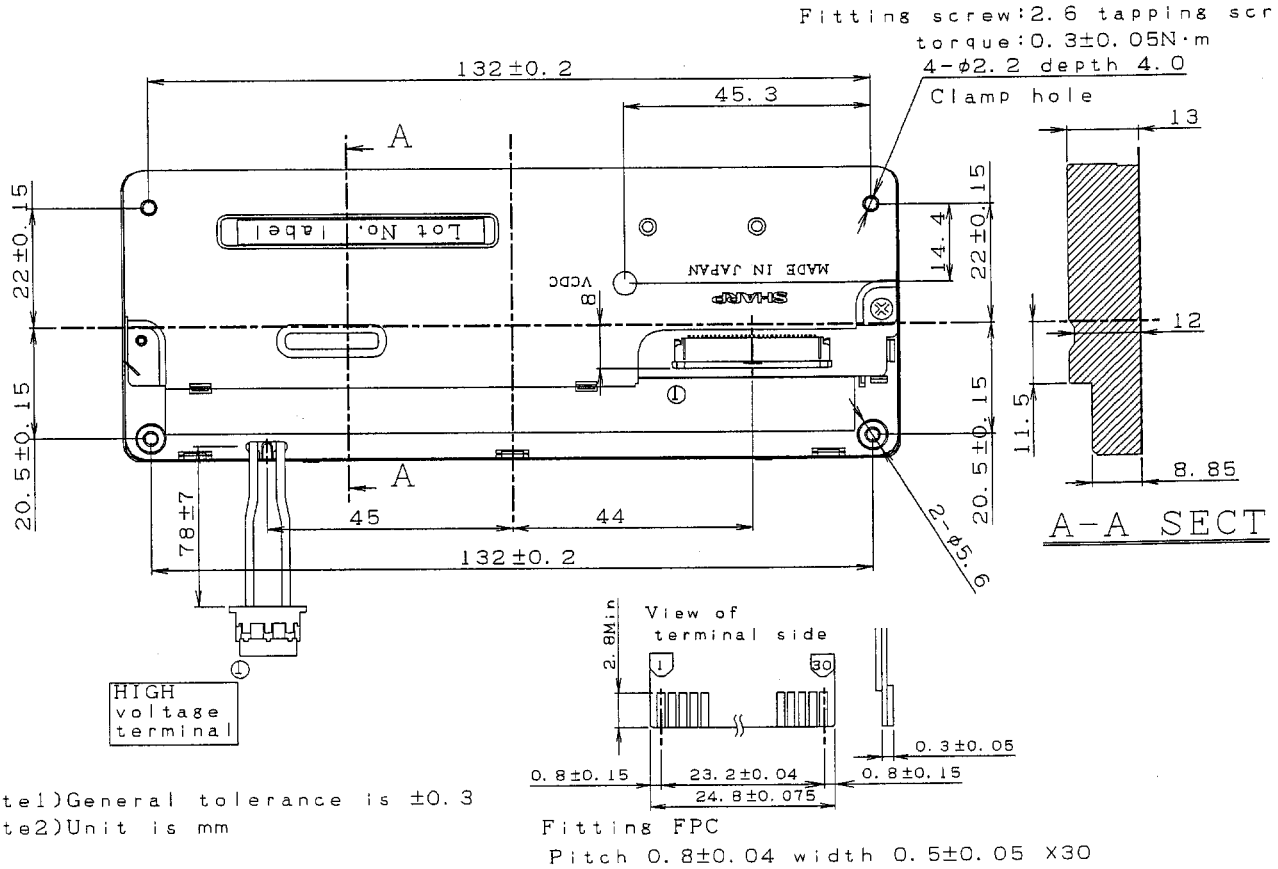
【Check items】 In the standard condition, there shall be no practical problems that may affect the display function.

X,Y,Z directions are shown as follows:





BL connector:BHR-02(8.0)VS-1N (JST) I/O connector:SFR30R-1STE1 (FCI)



note1)General tolerance is ±0.3
note2)Unit is mm

Fig.1 Outline Dimensions

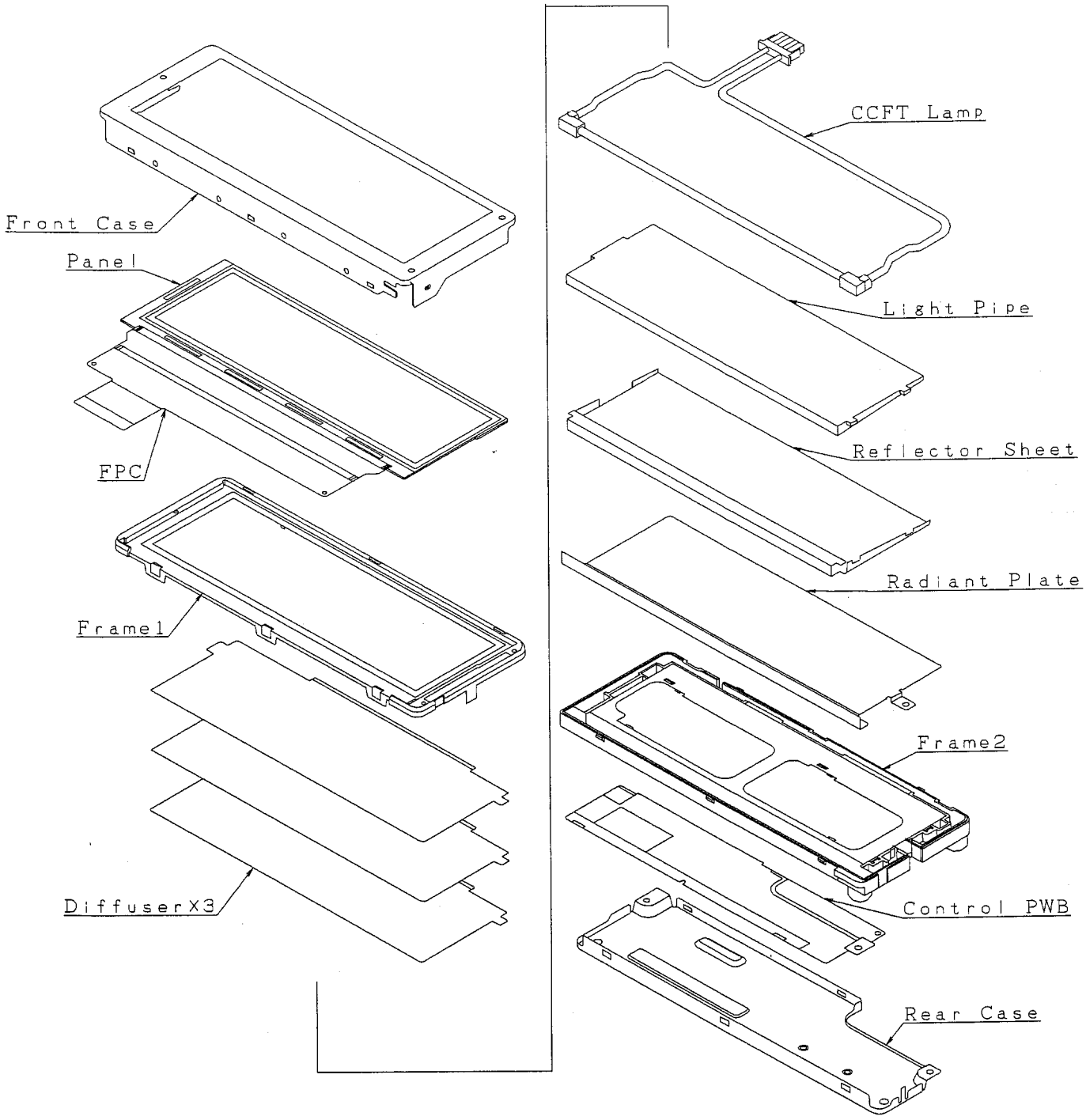


Fig.2 Construction of TFT-LCD module

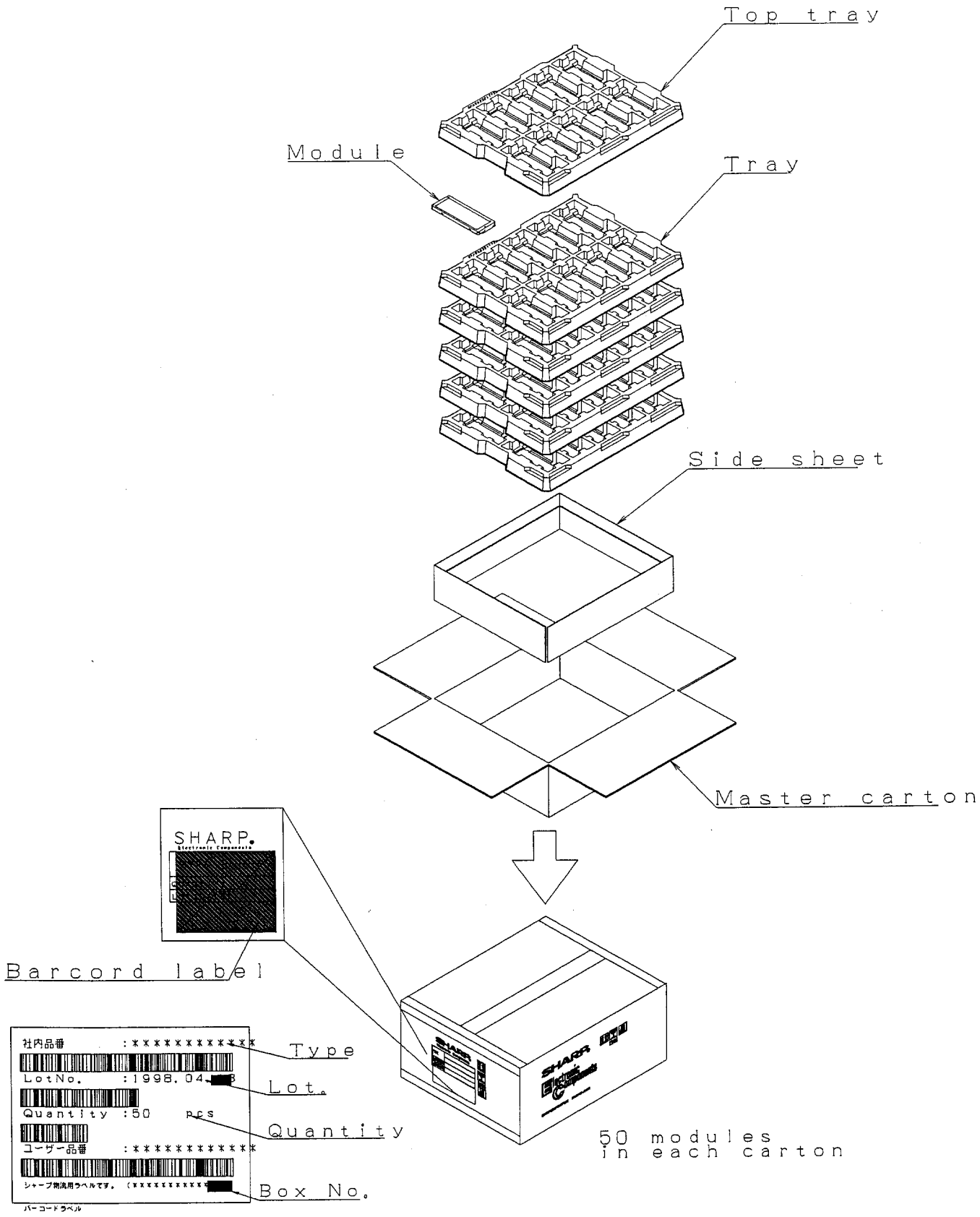


Fig.3 Packing Form